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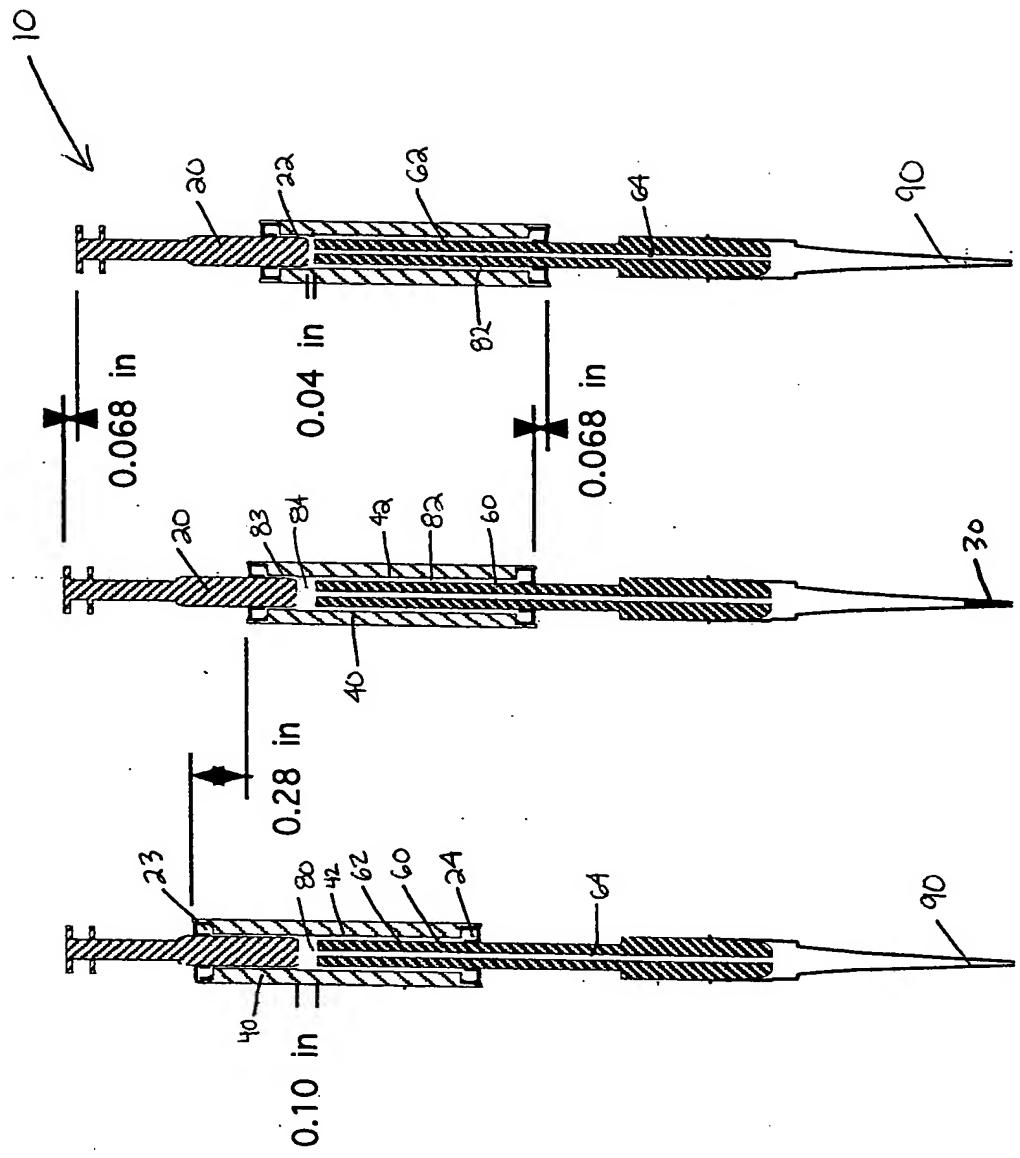


Fig. 1A

Fig. 1B

Fig. 1C

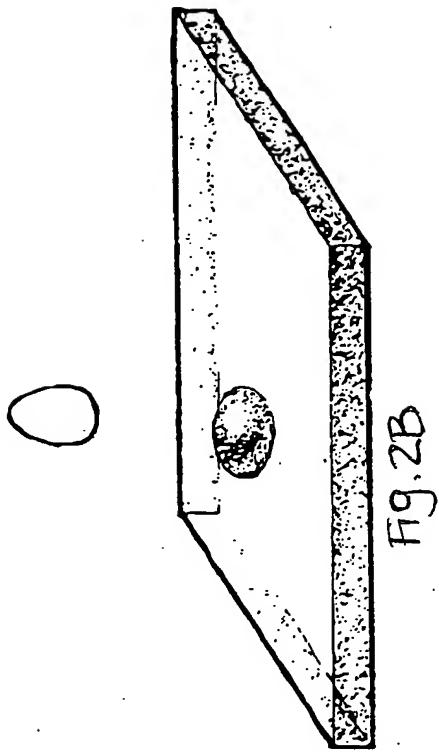
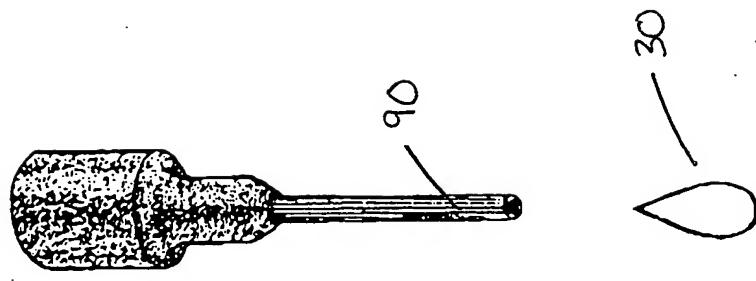


Fig. 2B

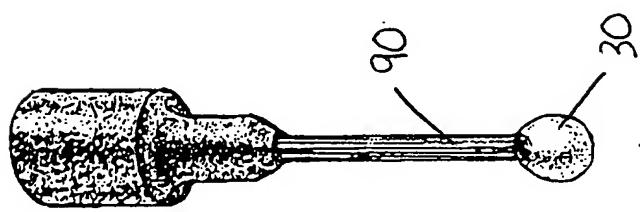


Fig. 2A

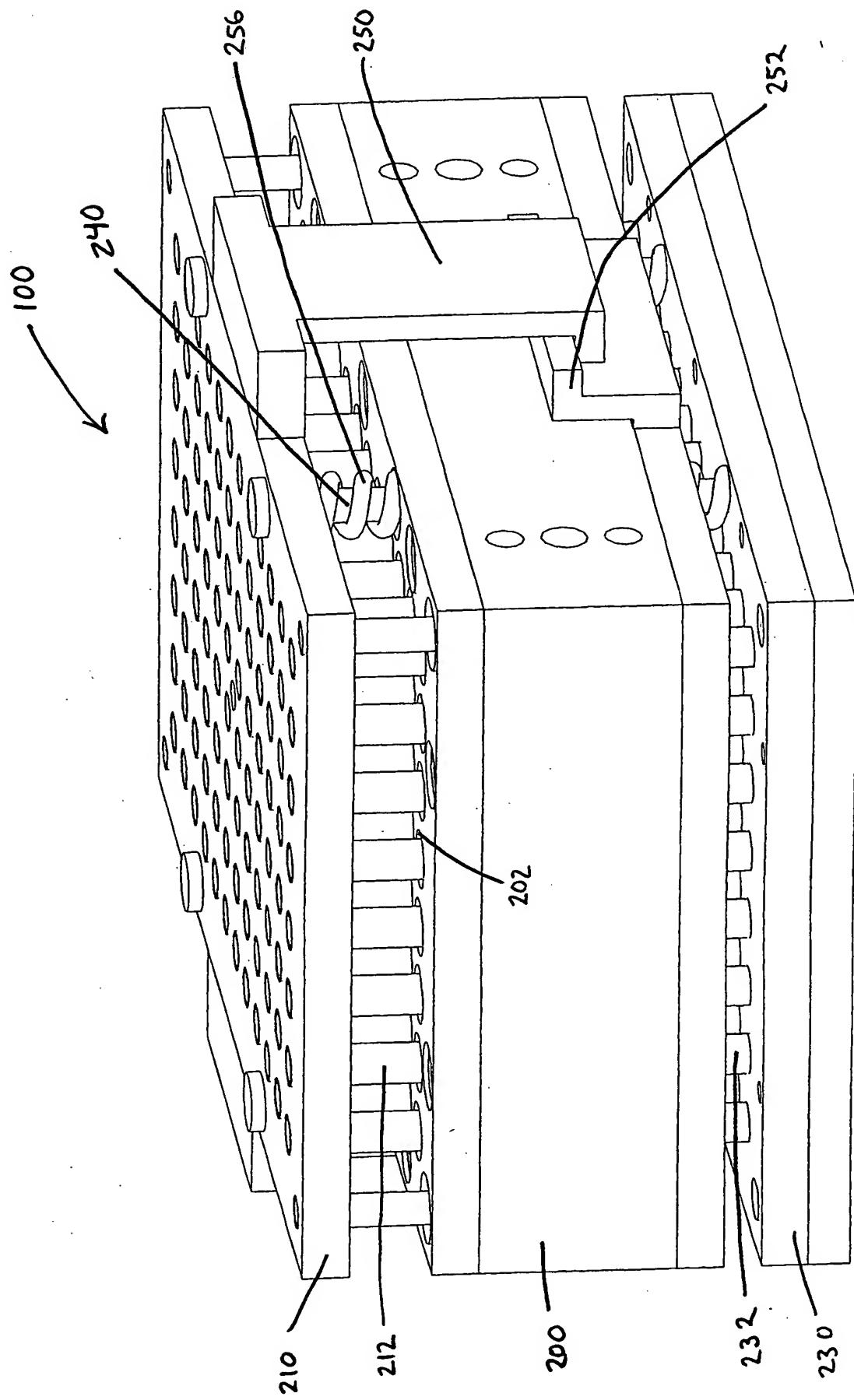


Fig. 3

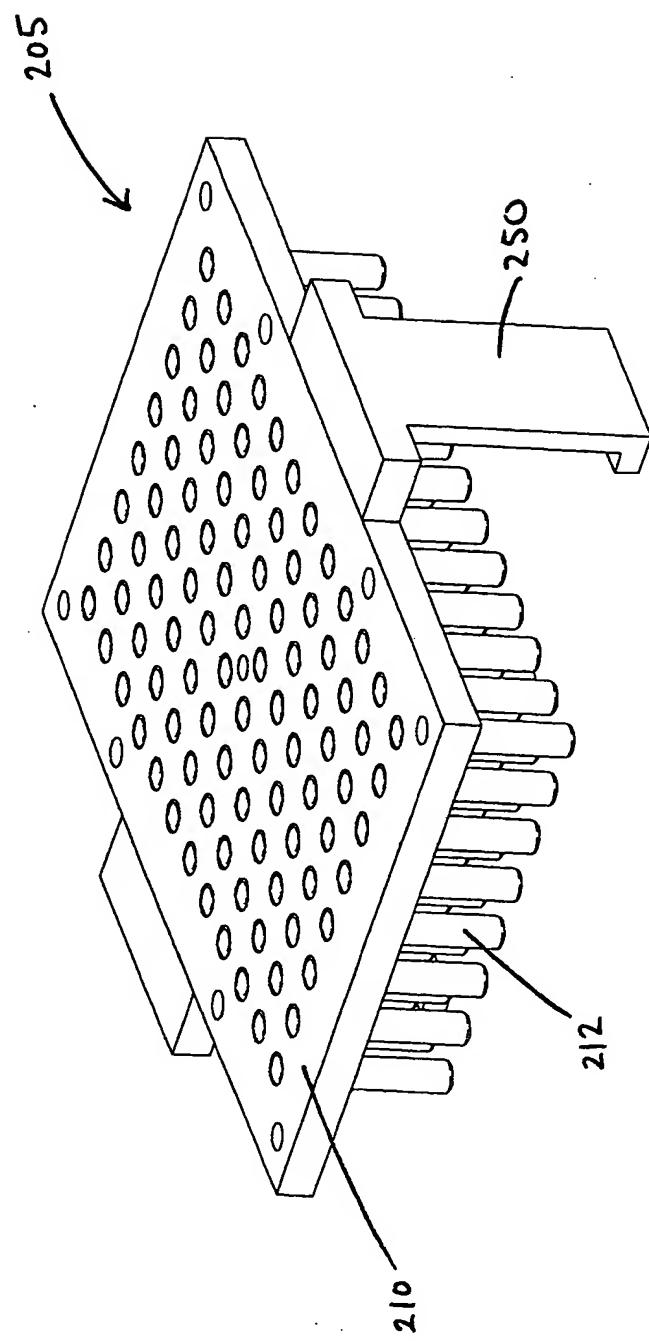


Fig. 3A

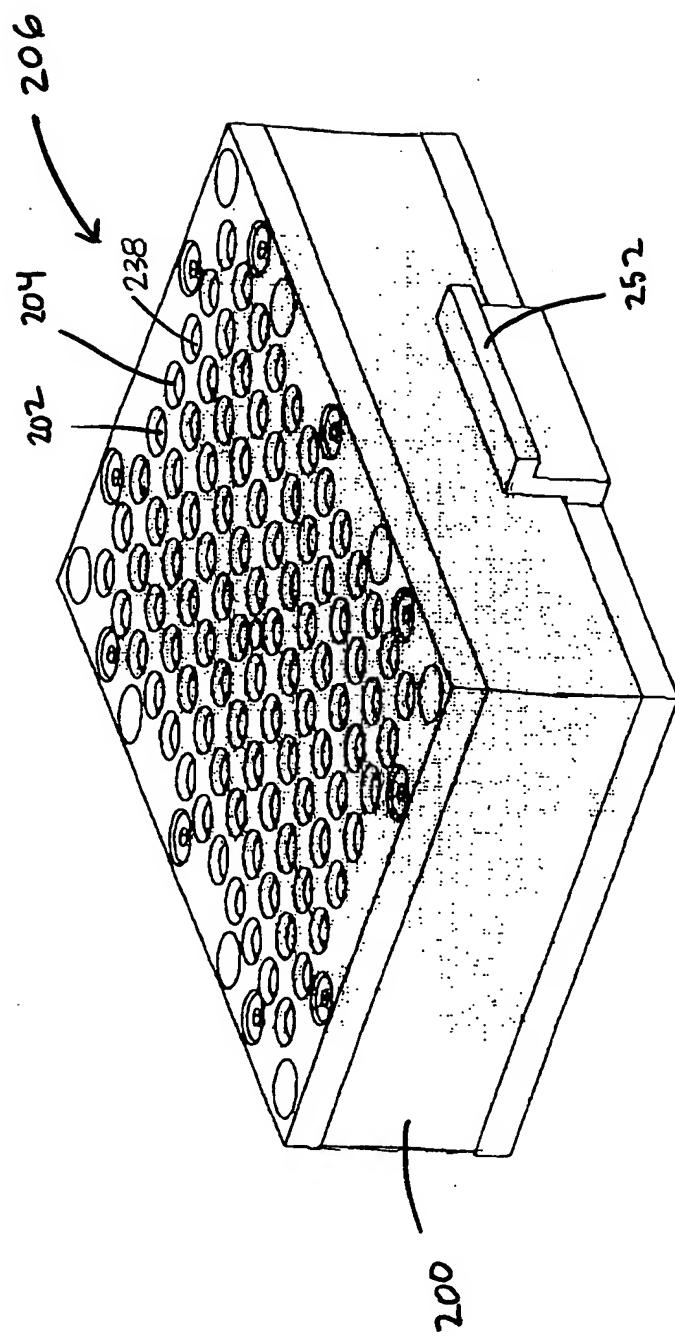


Fig. 3B

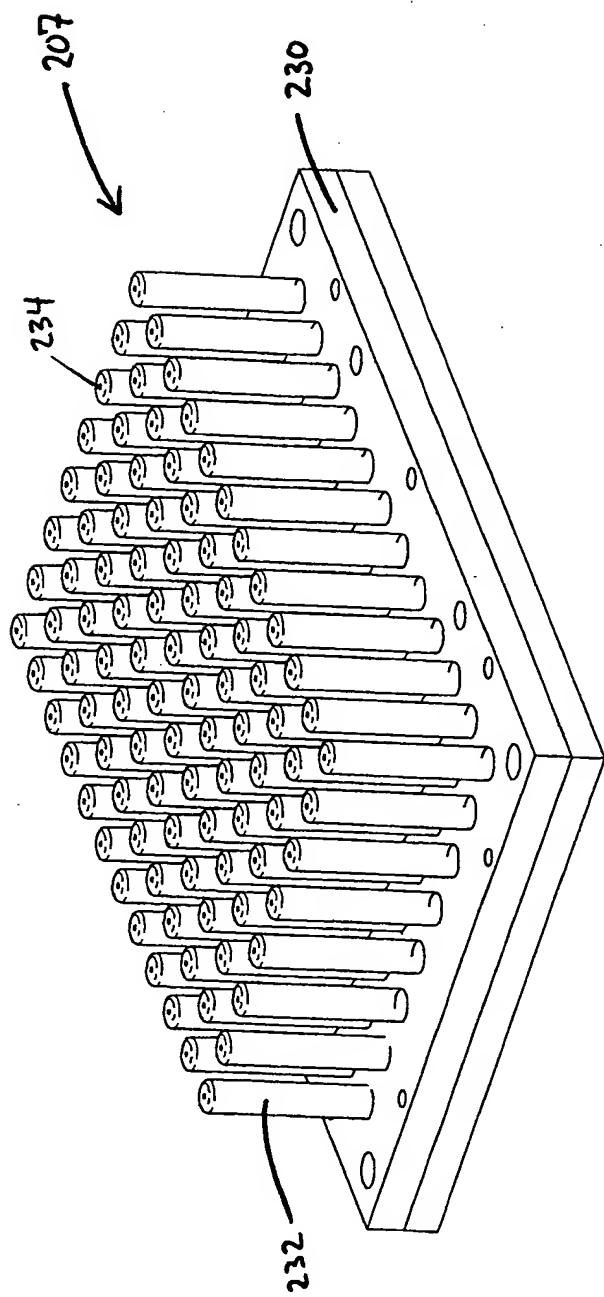


Fig.3c

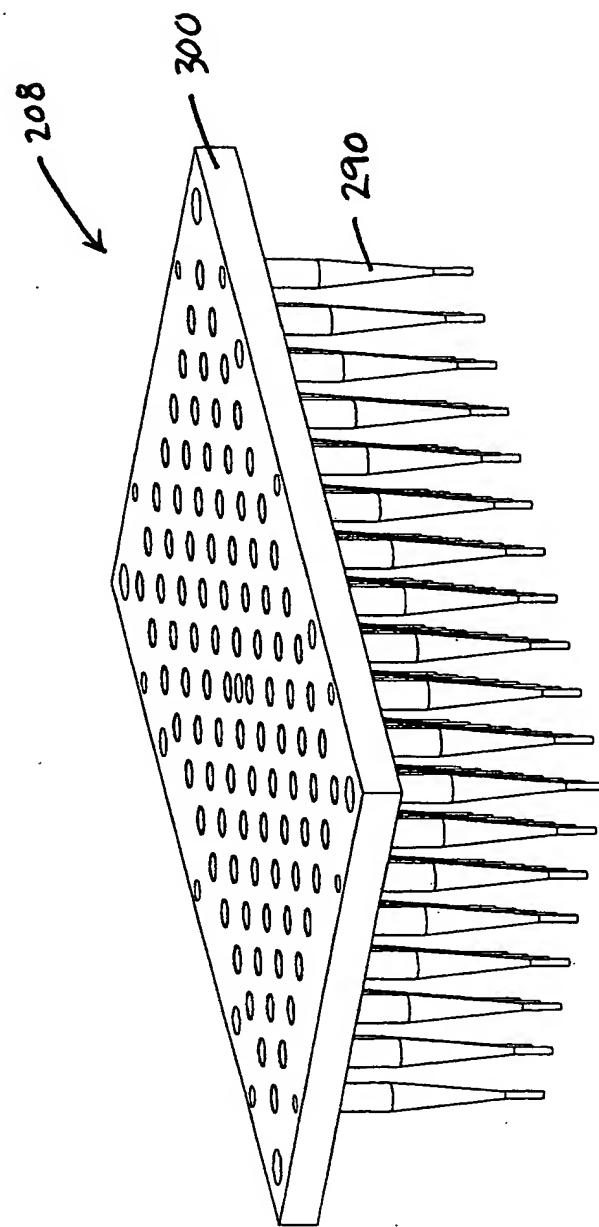


Fig. 3D

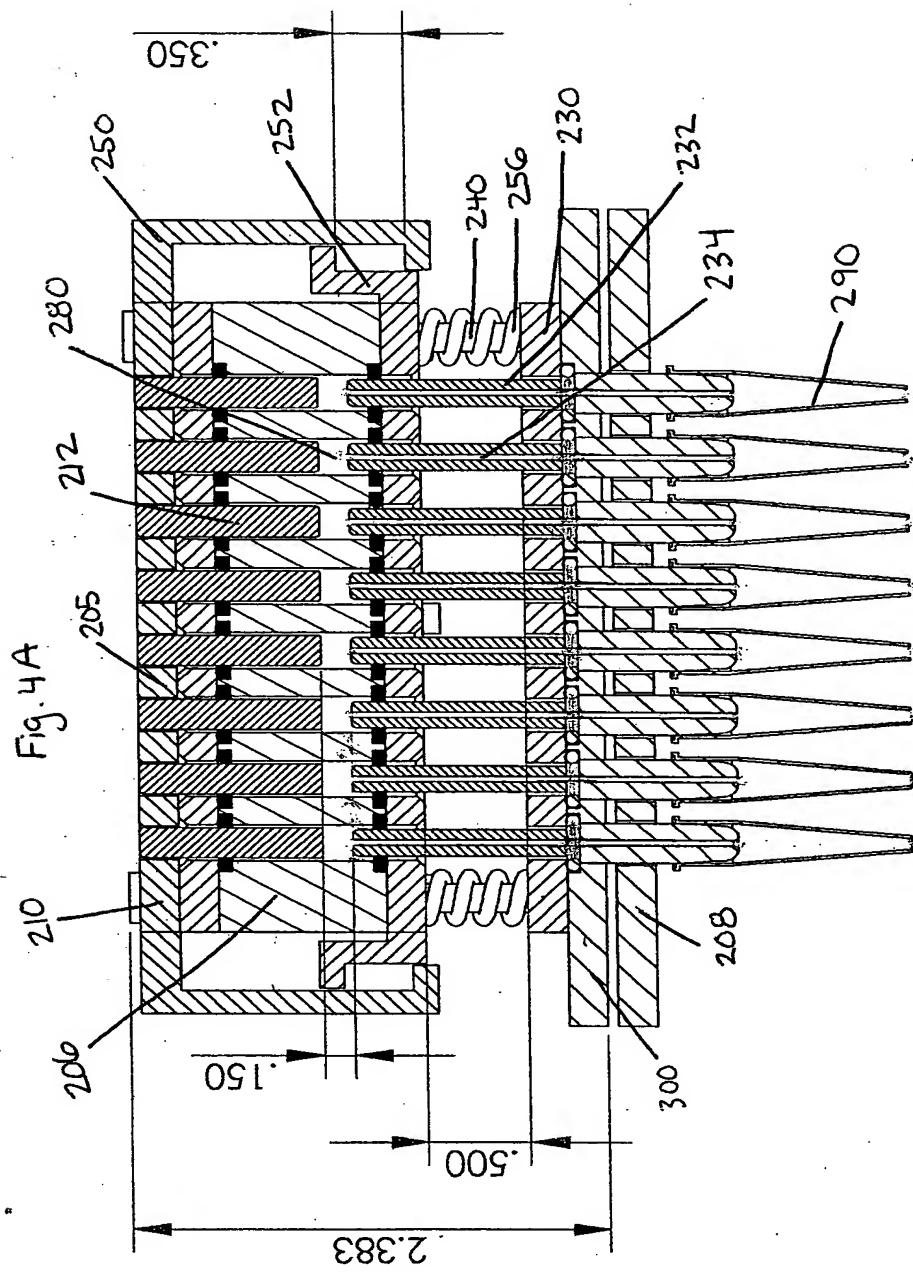
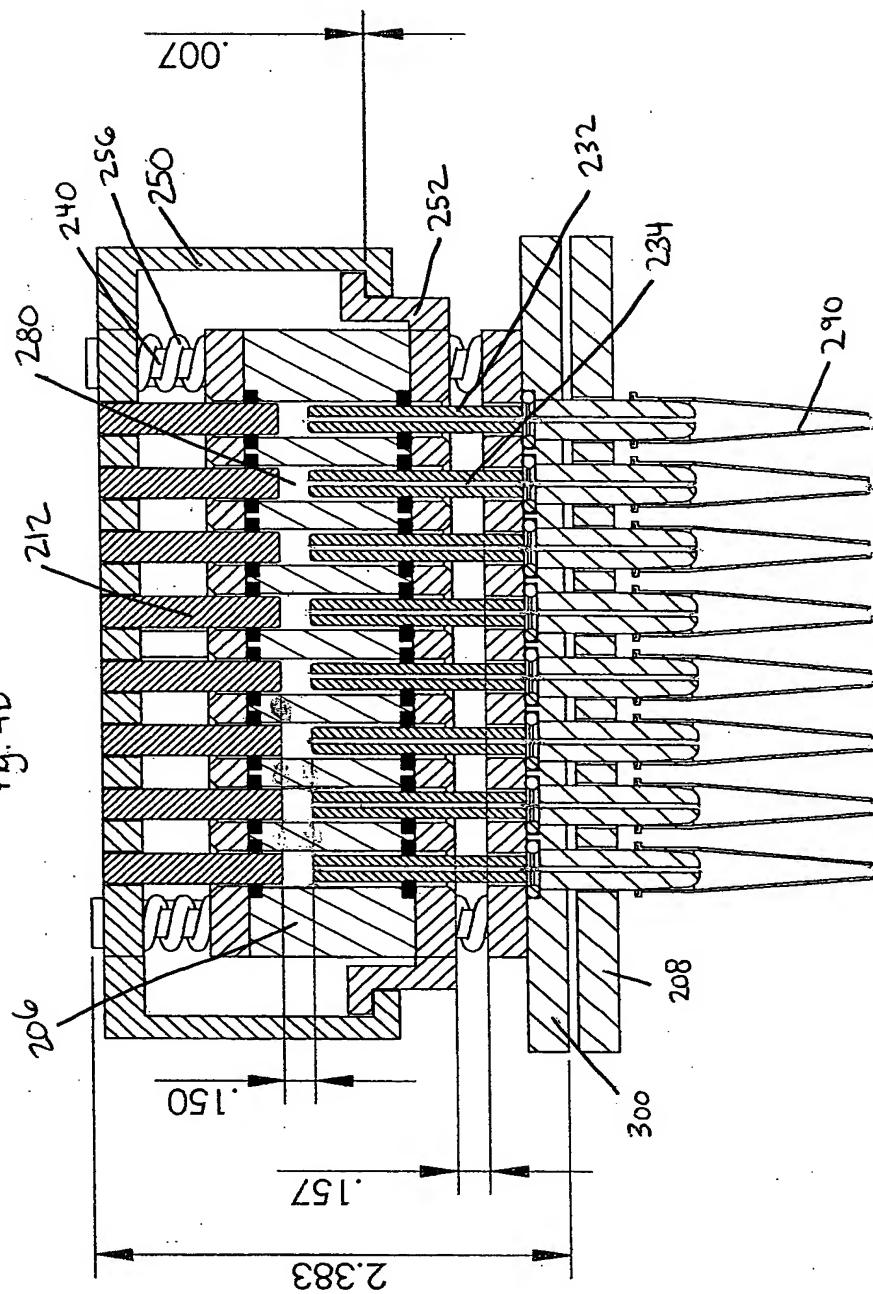


Fig. 4B



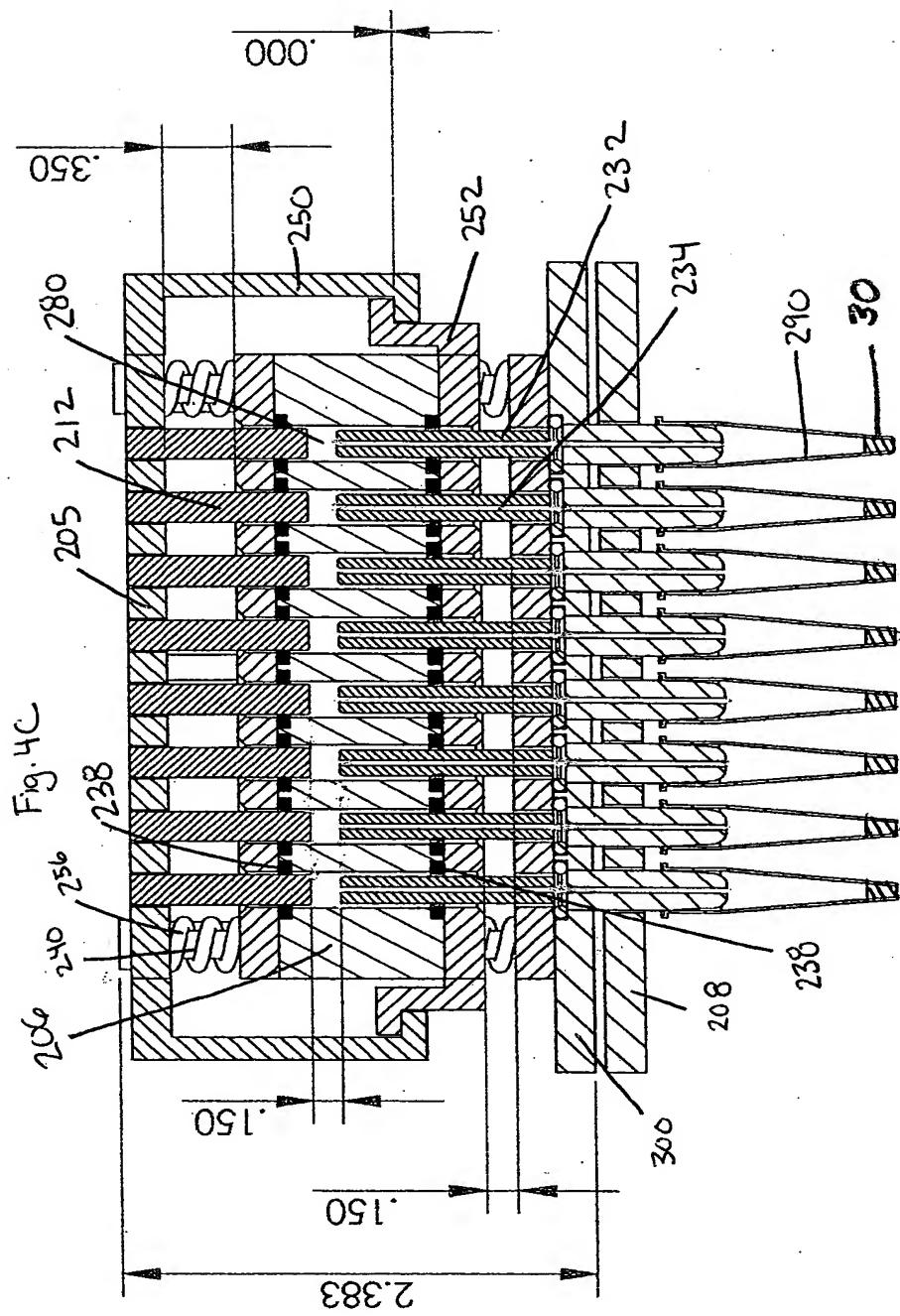


Fig. 4D

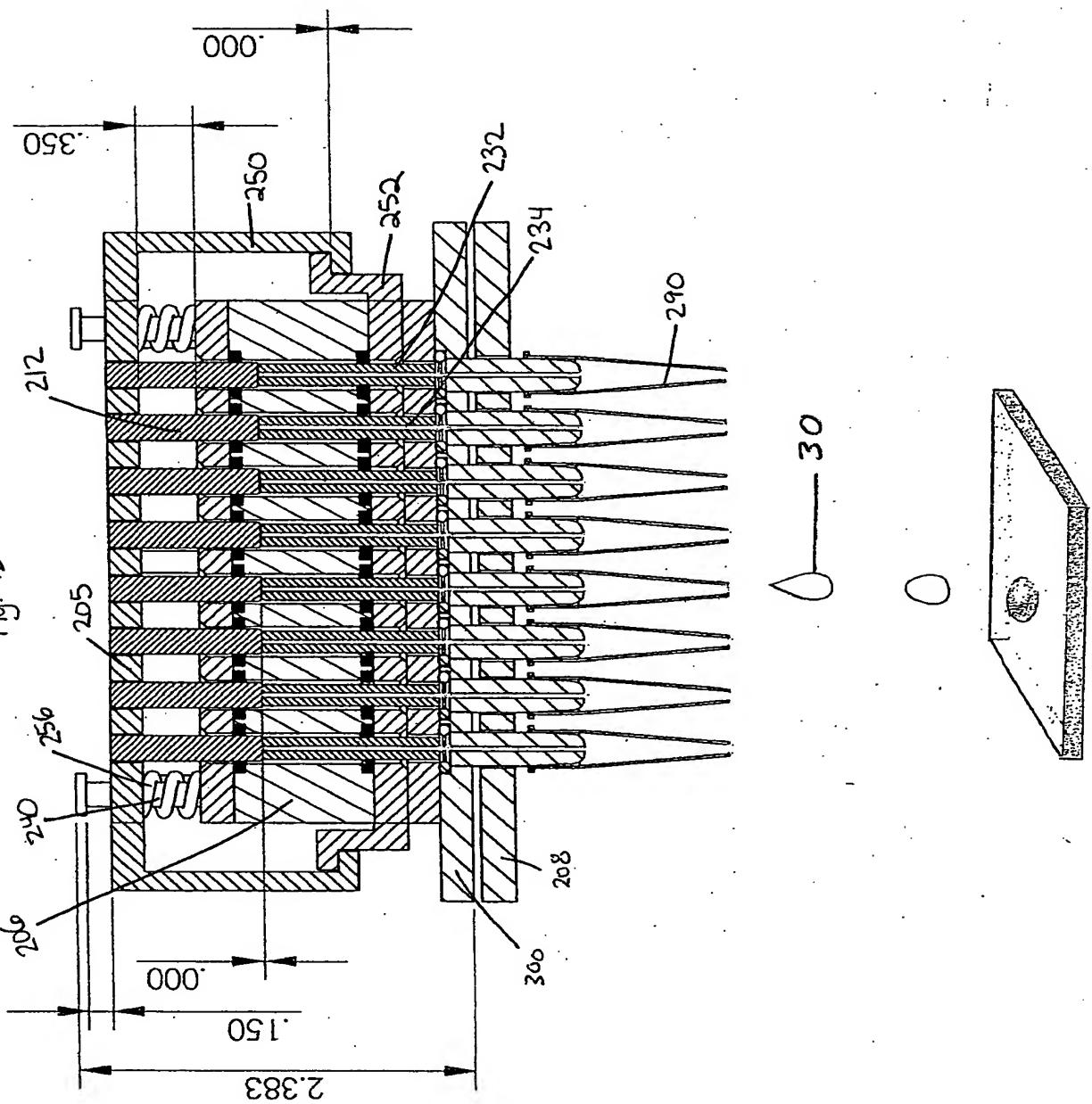


Figure 5.

| Cross Section | Diameter (inches) | Cross Sectional Area (square inches) | Res (uL/inch) | Res (mm/uL) | Flow Max (uL/sec) | Maximum Tip Escape Velocity (meters/sec) for tip diameters (inches) | | | | |
|---|---|--------------------------------------|---------------|-------------|-------------------|---|-------|-------|-------|------|
| | | | | | | 0.020 | 0.016 | 0.012 | 0.010 | |
|  | Hypothetical fine resolution conventional pipette | 0.033 | 0.0009 | 14 | 1.8 | 20 | 0.10 | 0.16 | 0.29 | 0.41 |
|  | Conventional pipette | 0.062 | 0.003 | 50 | 0.51 | 69 | 0.4 | 0.6 | 1.0 | 1.5 |
|  | Conventional pipette | 0.125 | 0.0123 | 202 | 0.13 | 282 | 1.4 | 2.3 | 4 | 6 |
|  | PRESENT INVENTION | 0.184 | 0.026 | 454 | 0.062 | 635 | 3 | 5 | 9 | 13 |
| | Differential mode (fine resolution) | 0.033 | 0.0009 | 14 | 1.8 | 20 | 0.10 | 0.16 | 0.29 | 0.41 |

0.187"

PRESENT
INVENTION

Bulk mode

Differential mode (fine resolution)

0.184"

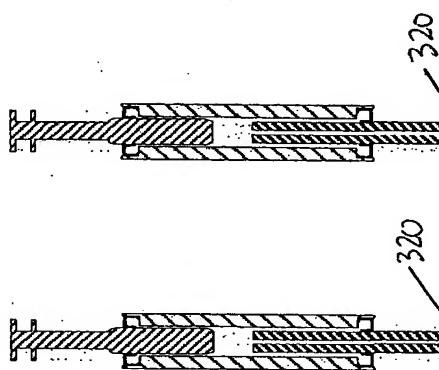


FIG 6.A

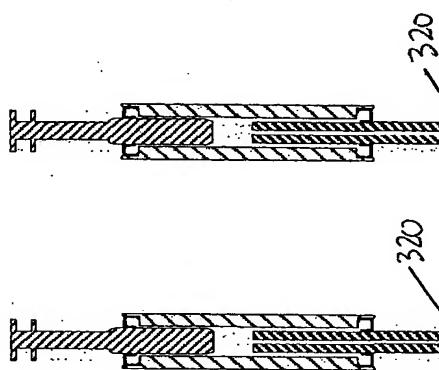


FIG 6.B

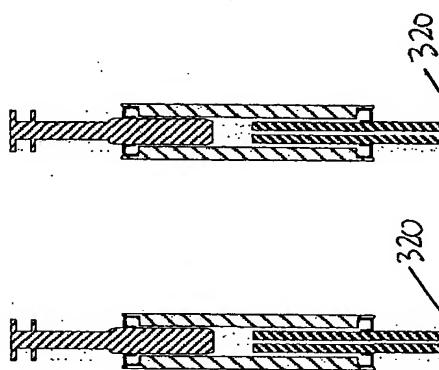


FIG 6.C

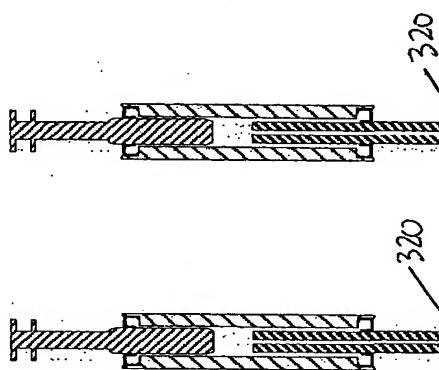


FIG 6.D

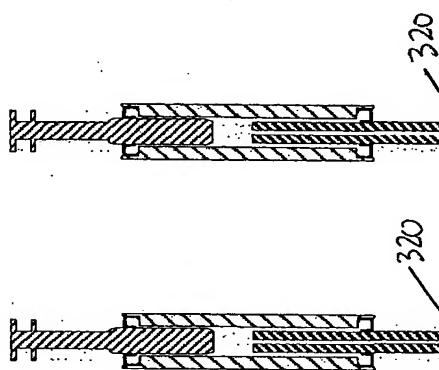


FIG 6.E

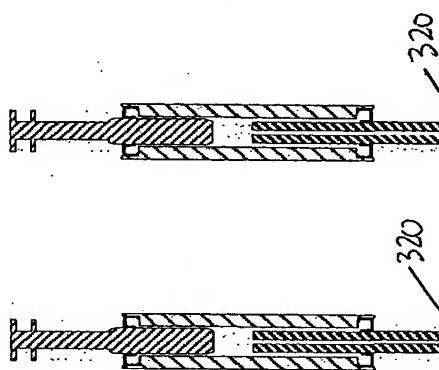


Fig 6.E

Total Dead Space 130 μ L 210 μ L 350 μ L 430 μ L 610 μ L

Smallest volume sample 0.17 μ L 0.60 μ L 1.5 μ L 2 μ L 2 μ L

(170 nanoliters) (600 nanoliters)

Largest volume sample 20 μ L 50 μ L 20 μ L 50 μ L 130 μ L

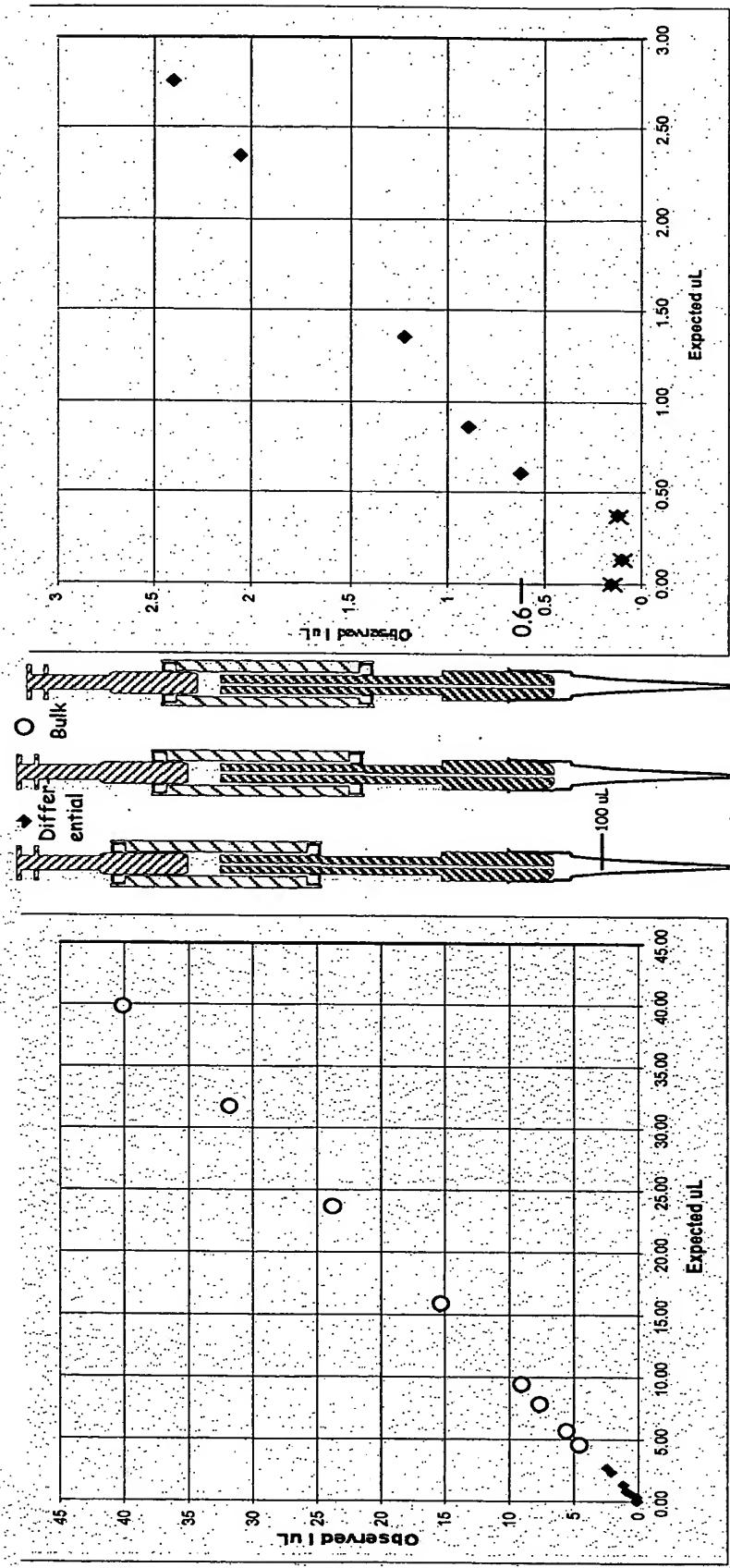


Fig. 7B

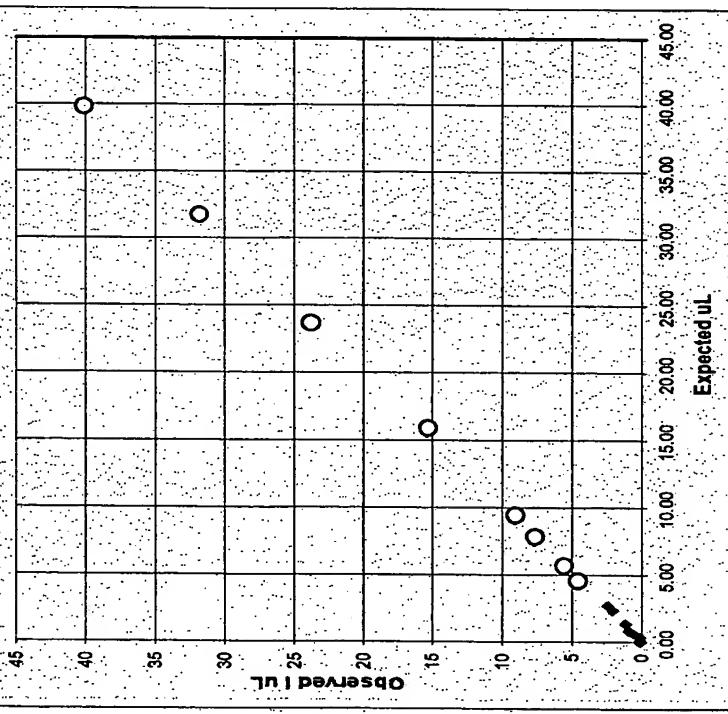


Fig. 7A

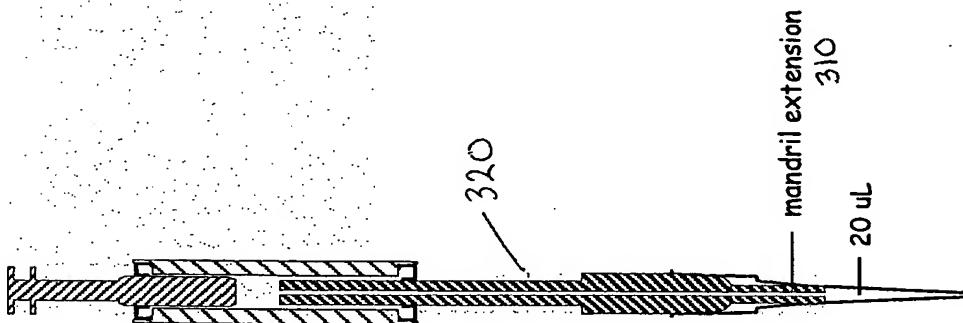
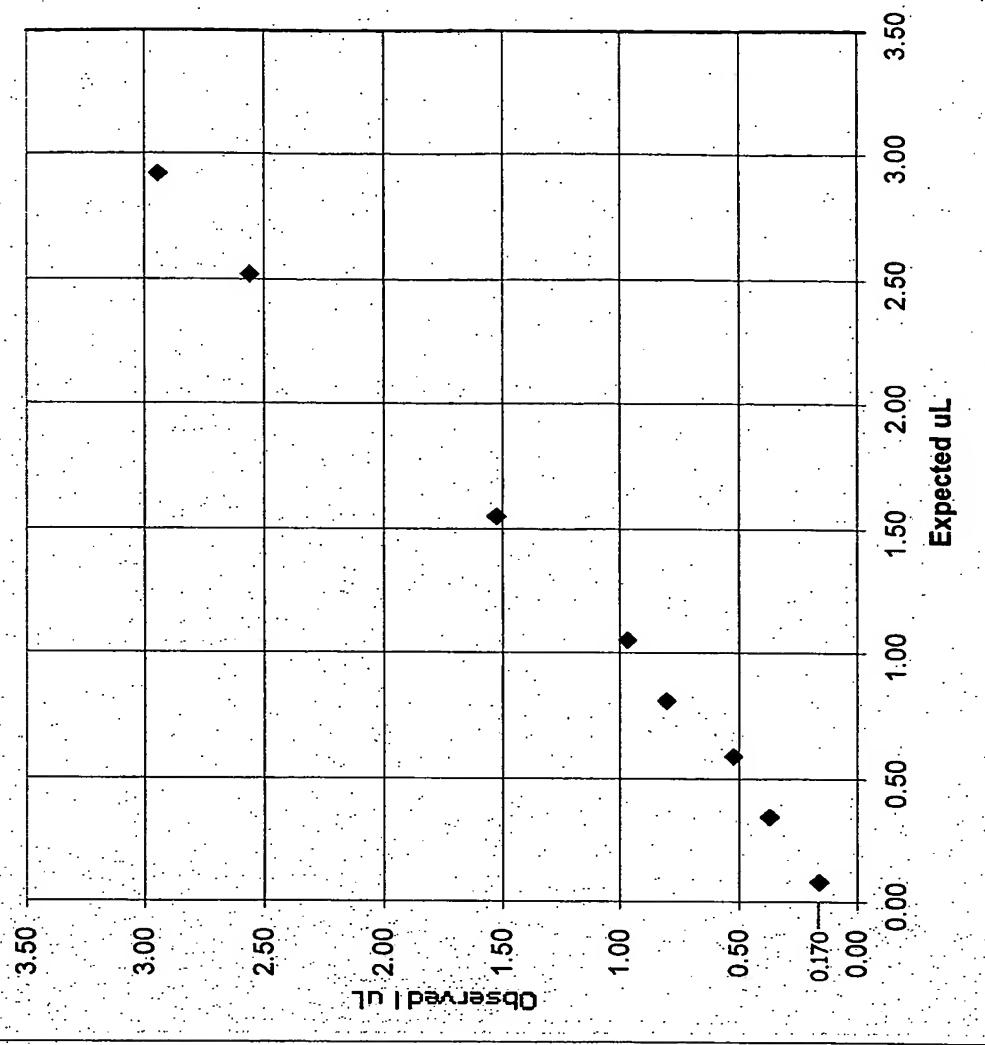
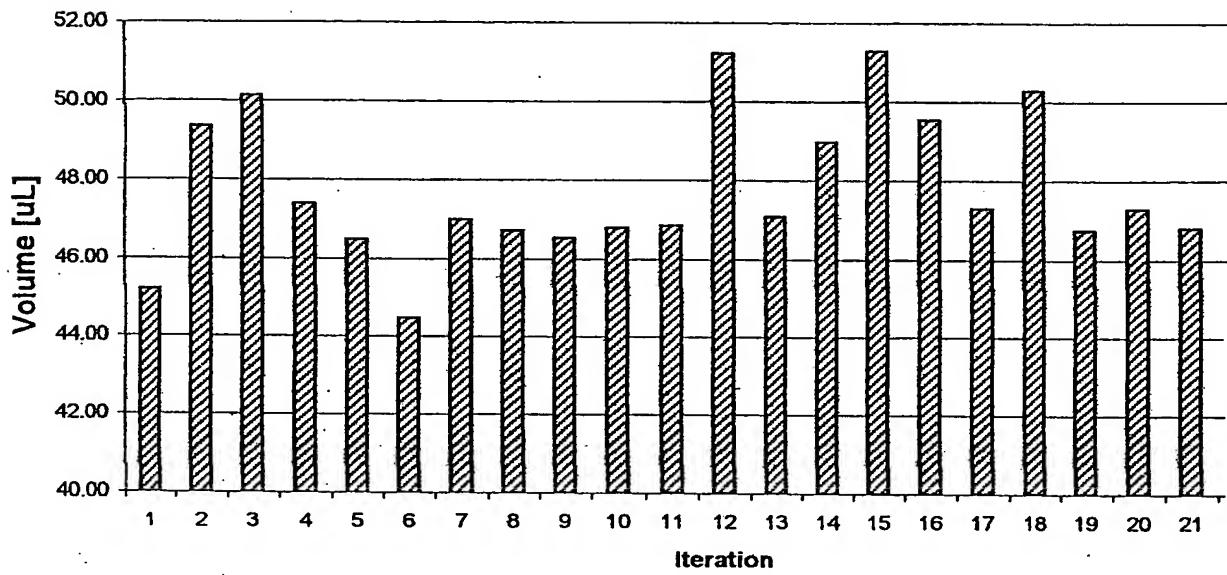


Fig. 8

FIG. 9

Dispense Precision in DRD BULK MODE *underwater*
in Large 5 mL (5,000 μ L) Internal Air Space Pipette
Standard Deviation 1.83 μ L CV 3.8%



Dispense Precision in DRD DIFFERENTIAL MODE *underwater*
in Large 5 mL (5,000 μ L) Internal Air Space Pipette
Standard Deviation 0.21 μ L CV 0.4%

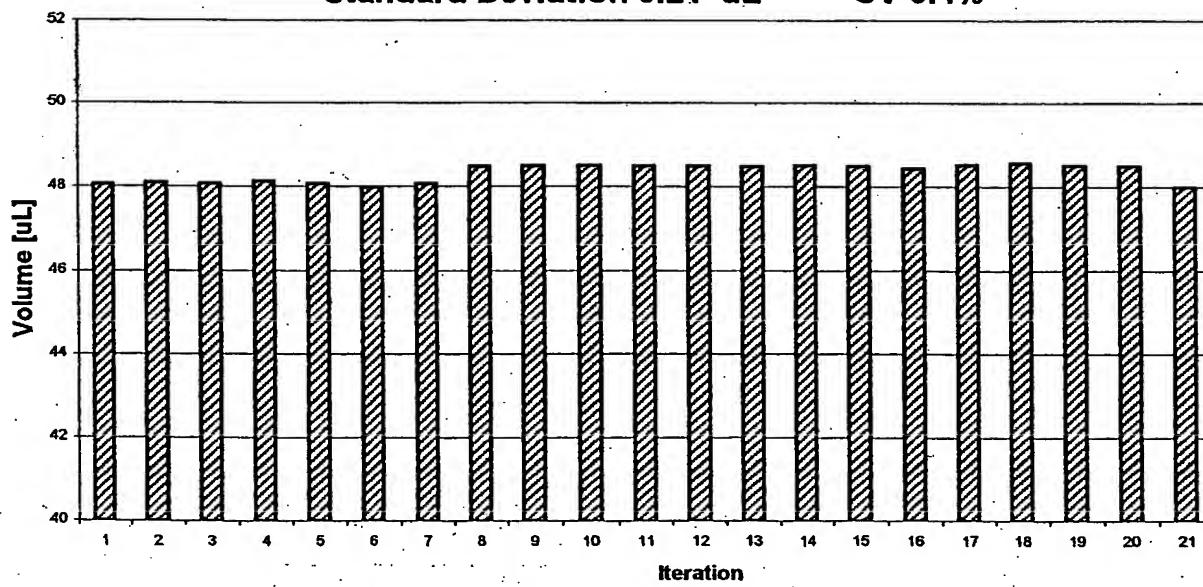


Fig. 10

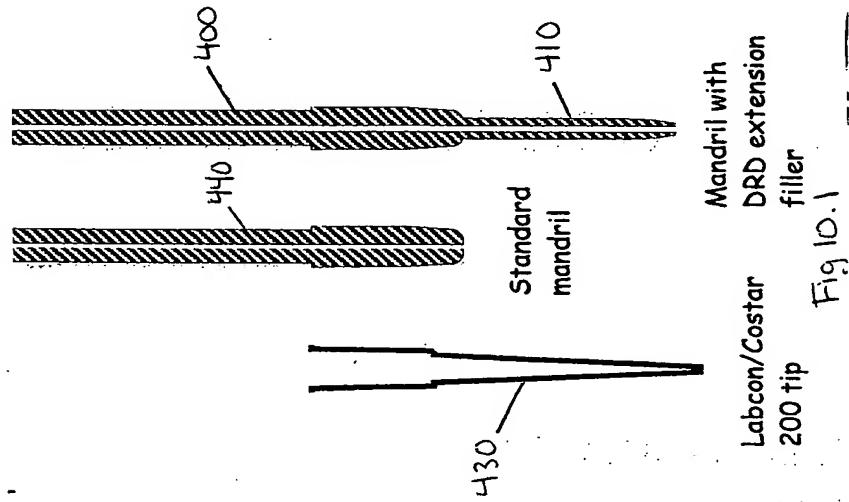


Fig.10.2

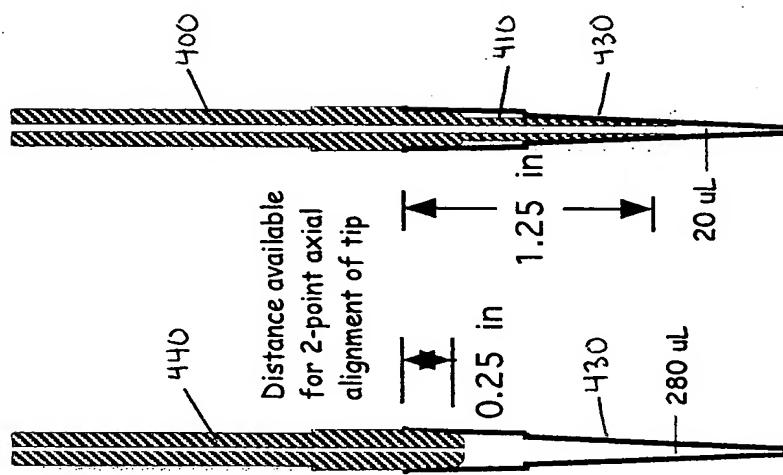


Fig 10.3

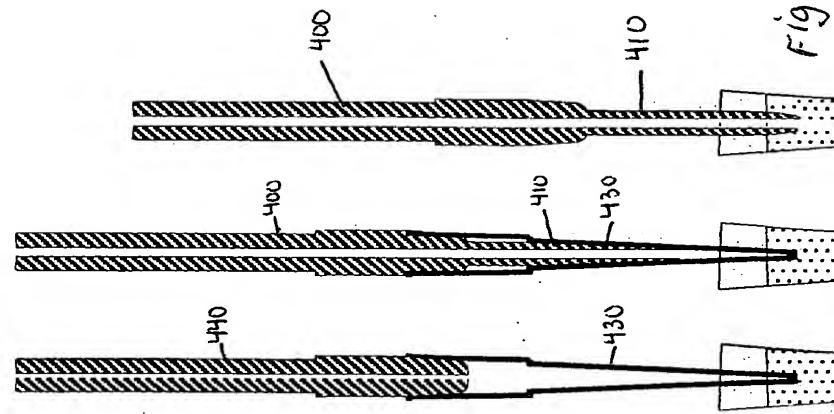


Fig. 10.3

Fig. 11



Fig. 11.1



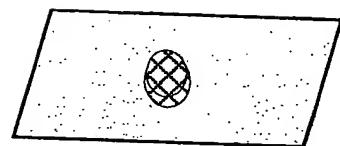
Fig. 11.2



Fig. 11.3



Fig. 11.4



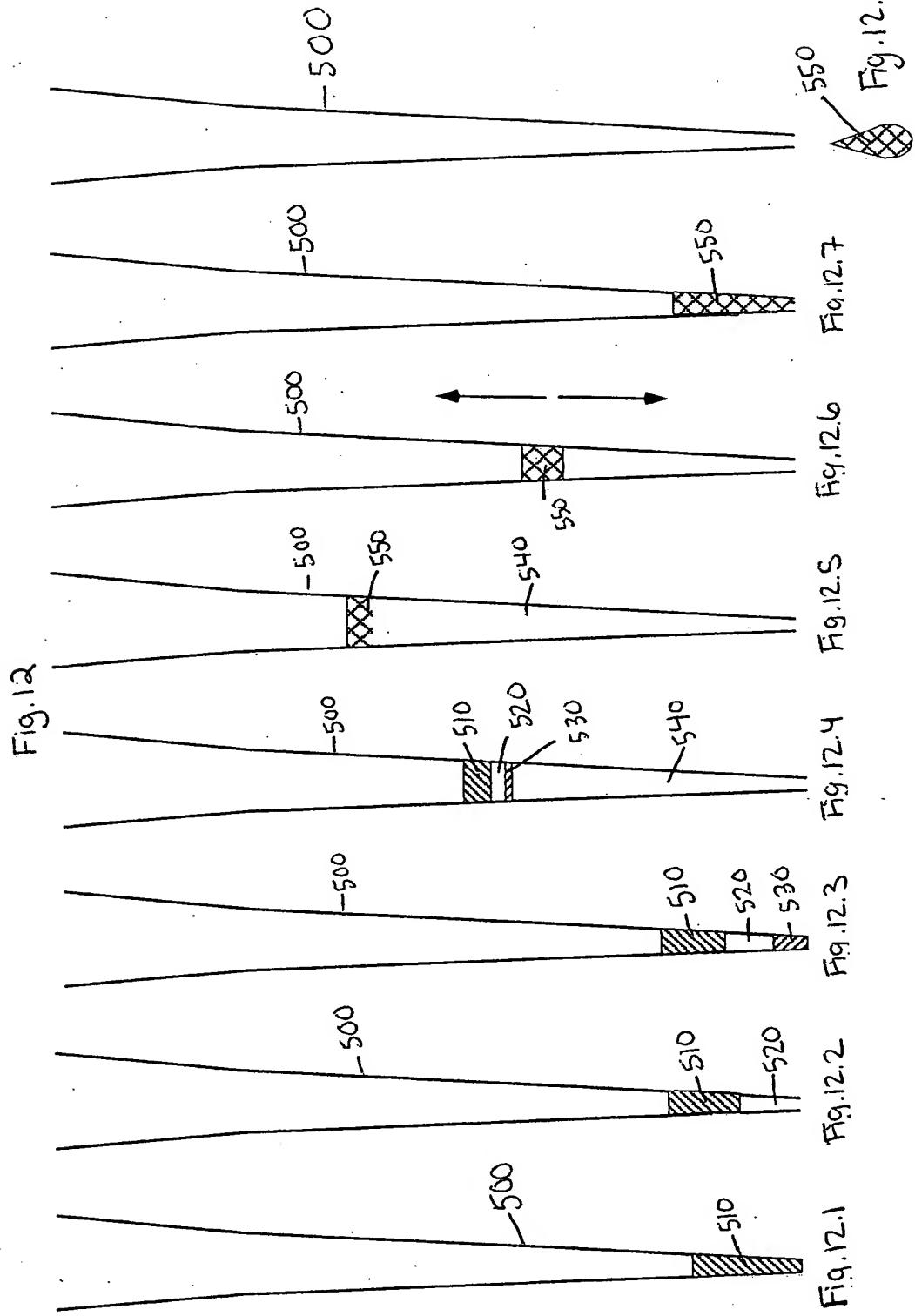


Fig. 13

